ADVANCED – Message File Format

S443.doc

A MESSAGE file is created during each simulation. The file contains information from certain key subroutines that can be used for diagnostic purposes if a simulation were to fail. An example file is shown below in the left column from the test concentration simulation. A trajectory MESSAGE file would be similar but without the particle number and mass information. In the right column, in red, a more detailed description of each item is provided.

```
HYSPLIT46 (Oct 2003)

-- Start Namelist configuration --

Internal grid parameters
(nlvl,aa,bb,cc): 19 30.0 -25.0 5.0

 &SETUP
 INITD   =           4,
 KHMAX   =        9999,
 NUMPAR  =         500,
 MAXPAR  =       10000,
 MAXDIM  =           1,
 QCYCLE  =  0.0000E+00,
 FRME    =  0.10000000,
 FRMR    =  0.0000E+00,
 KRND    =           6,
 DELT    =  0.0000E+00,
 ISOT    =           0,
 TKER    =  0.50000000,
 NDUMP   =           0,
 NCYCL   =           0,
 TRATIO  =  0.75000000,
 MGMIN   =          10,
 KMSL    =           0,
 NSTR    =           0,
 CPACK   =           1,
 ICHEM   =           0,
 NOUT    =           0,
 TM_PRES =           0,
 TM_TPOT =           0,
 TM_TAMB =           0,
 TM_RAIN =           0,
 TM_MIXD =           0,
 DXF     =   1.0000000,
 DYF     =   1.0000000,
 DZF     =  9.9998E-03,
 NINIT   =           1,
 PINPF   = PARINIT,
 POUTF   = PARDUMP

 -- End Namelist configuration ---

 NOTICE   main: pollutant
 initialization flags
Gas pollutant -  T
```

Current version and release date

Tabulates value of namelist variables

Number of internal model sigma levels and the polynomial parameters used to describe the vertical grid. These are configured automatically based upon the meteorological input data files defined for this simulation.

The value of all variables that can be defined by the SETUP.CFG namelist file are listed. If no SETUP.CFG file was defined for this simulation, then the default values for these variables are listed.

The settings of all internal deposition flags are shown here. In this case the simulation is for a gas.

```
NOTICE metpos: (mtime,ftime) -
50379840           0

NOTICE metpos: (mtime,ftime) -
50379960           0
```

The subroutine that determines which meteorological data are required is called for the first time. Data for times 840 and 960 are requested. The zeros for the second field indicate no data are in memory. Times are always in relative minutes.

```
NOTICE advpnt: (kg,nx,ny,nz) -
1  10  10 19
```

The first advection entry sets sub-grid #11 to 10x10 with 19 levels.

```
NOTICE sfcinp: reading ASCDATA.CFG
```

The surface boundary files are opened.

```
NOTICE metgrd: (kg, xyr,xy1) -
1  10  10  17  9
```

The lower left corner of sub-grid #1 is set at position 17,9 of the main meteorological data grid.

```
NOTICE metinp: NGM 1 1 10 10
17  9  50379840 95 10 16 0
```

The NGM data for the first computational hour are read starting at record #1, loaded into a 10x10 sub-grid, corner 17,9, at time [x]840 for the date: 95 10 16 0

```
##################################
WARNING prfsig: extrapolation from
level (k,m):  16   7159.121
Input data levels:     10
Internal Sigma levels: 19
##################################
```

When these data are interpolated to the internal grid, it is determined that there are no input data records above 7159 m, therefore data for those levels are extrapolated.

```
NOTICE metinp: NGM  1 63 10 10 17  9
50379960 95 10 16 2
```

Computations for the first hour require data at two time periods for interpolation (hours 0 and 2).

```
NOTICE   main: Initial time step
(min)          20
```

The initial time step was set to 20 minutes. Subsequent time steps may change.

```
NOTICE   main: 1 50379860
166  0.3333332
NOTICE   main: 1 50379880
332  0.6666647
NOTICE   main: 1 50379900
498  0.9999961
```

The time, number of particles, and the total mass is shown for the three time steps of the first hour. After one hour the emission stops.

```
NOTICE   main: 2 50379930
498  0.9999961
NOTICE   main: 2 50379960
498  0.9999961
```

During hour two, no further emissions (or particles) are released. The time step is now 30 minutes.

```
NOTICE metpos: (mtime,ftime) -
50380080    50379840
```

After the hour 2, new NGM data are required. The data in memory at 0 UTC (time 840) are replaced with data at 4 UTC (time 080).

```
NOTICE metinp: NGM 1 125 10 10 17 9
50380080 95 10 16 4
```

The new data are input into the same sub-grid location.

```
NOTICE   main: 3 50379990
498  0.9999961
NOTICE   main: 3 50380020
498  0.9999961
NOTICE   main: 4 50380050
498  0.9999961
NOTICE   main: 4 50380080
498  0.9999961
```

Computations proceed as before for computational hours 3 and 4. Particle number remains the same because no particles have moved off the computational domain. The mass remains the same because deposition is not turned on for this simulation.

```
NOTICE metpos: (mtime,ftime) -
50380200    50379960
NOTICE metinp: NGM 1 187 10 10 17 9
50380200 95 10 16 6
```

At the end of hour 4, data are required for 6 UTC (time 200) to proceed with the calculation. These data replace the 2 UTC (time 960) in memory.

```
NOTICE   main: 5 50380110
498  0.9999961
NOTICE   main: 5 50380140
498  0.9999961
NOTICE   main: 6 503801704
498  0.9999961
NOTICE   main: 6 50380200
498  0.9999961
```

Computations proceed to hour 6.

```
Index  Height %Mass
6   935.0  1.41
5   630.0 10.84
4   385.0 31.33
3   200.0 29.72
2    75.0 20.48
1    10.0  6.22
```

Every 6 hours, the model prints out the vertical mass distribution of all the particles within the computational domain. This is the mass distribution relative to the model's internal sigma levels and there is no relation to the levels that may be specified for the concentration output file. Only non-zero levels are shown. The internal levels are defined by the polynomial parameters given at the beginning of the MESSAGE file.

At this point the computation will continue for the number of hours specified in the CONTROL file. Vertical profiles are shown every 6 hours. As the particles move across the computational domain, the sub-grid position may be moved (from position 17,9) or expanded larger than 10x10) to match the spatial extent of the particle distribution. This may occur at any time during the computation or even multiple times during the same computational hour.